

We claim:

1. An automated method for staining biological materials on a slide, comprising:

a) providing at least a first and second stable solution, wherein the at least first and second stable solutions when combined comprise an unstable staining solution;

b) providing a slide, wherein a biological material to be stained is present on the slide;

c) providing an automated delivery system to deliver a predetermined quantity of the at least first and second stable solutions to the biological material on the slide;

d) sequentially applying the at least first and second stable solutions to the biological material on the slide using the automated delivery system; and

e) mixing the at least first and second stable solutions on the biological material.

2. The method of claim 1 wherein the step of mixing includes applying at least two gas streams to form a vortex.

3. The method of claim 1 wherein said biological material is selected from the group consisting of tissue sections, tissue culture cells, cell components, including cell organelles, chromosomes, nucleic acids, carbohydrates, lipids, and proteins, smears of blood, sputum, and other body fluids, excretions and secretions, and micro-organisms including parasites, viruses, bacteria, and fungi.

4. The method of claim 1 wherein said unstable staining solution is selected from the group consisting of fungi staining solutions, silver staining solutions, iron staining solutions, iron hematoxylin solutions, trichrome staining solutions, mucin stains, mucicarmine staining solutions, Verhoeff's staining solution, amyloid staining solutions, and Steiner staining solution.

5. The method of claim 1 wherein the mixing is accomplished by applying a gas stream to the at least first and second stable solutions on the biological material.

6. An automated method for silver staining biological materials on a slide, comprising:

a) providing a solution of from about 0.2% to about 1.0% silver nitrate, wherein the silver nitrate is at least first and second stable solutions when combined comprise an unstable staining solution;

b) providing a solution of from about 2.0% to about 4.0% methenamine

5 c) providing a solution of from about 0.2% to about 0.6% borax

d) providing a slide, wherein a biological material to be stained is present on the horizontal slide;

e) providing an automated delivery system to deliver a predetermined quantity of the silver nitrate, methenamine, and borax solutions to the biological material on the slide;

f) sequentially applying the silver nitrate, methenamine, and borax solutions to the biological material on the slide using the automated delivery system; and

15 g) mixing the silver nitrate, methenamine, and borax solutions to stain the biological material.

7. An automated method for silver staining biological materials on a slide, comprising:

a) providing a solution of from about 0.2% to about 1.0% silver nitrate;

20 b) providing a solution of from about 0.3% to about 1.0% ammonium hydroxide

c) providing a solution of from about 0.7% to about 1.5% sodium hydroxide

d) providing a slide, wherein a biological material to be stained is present on the slide;

25 e) providing an automated delivery system to deliver a predetermined quantity of the silver nitrate, ammonium hydroxide, and sodium hydroxide solutions to the biological material on the slide;

f) sequentially applying the silver nitrate, ammonium hydroxide, and sodium hydroxide solutions to the biological material on the slide using the automated delivery system; and

30 g) mixing the silver nitrate, ammonium hydroxide, and sodium hydroxide solutions to stain the biological material.

8. An automated method for trichrome or mucicarmine staining of biological materials on a slide, comprising:

- a) providing a solution of from about 0.7% to about 1.5% hematoxylin;
- b) providing a solution of from about 0.5% to about 1.5% aqueous ferric chloride
- 5 c) providing a slide, wherein a biological material to be stained is present on the slide;
- d) providing an automated delivery system to deliver a predetermined quantity of the hematoxylin and aqueous ferric chloride solutions to the biological
- 10 material on the slide;
- e) sequentially applying the hematoxylin and aqueous ferric chloride solutions to the biological material on the slide using the automated delivery system; and
- f) mixing the hematoxylin and aqueous ferric chloride solutions to stain
- 15 the biological material.

9. An automated method for iron staining of biological materials on a slide, comprising:

- a) providing a solution of from about 8% to about 12% potassium ferrocyanate;
- 20 b) providing a solution of from about 15% to about 30% hydrochloric acid
- c) providing a slide, wherein a biological material to be stained is present on the slide;
- d) providing an automated delivery system to deliver a predetermined
- 25 quantity of the potassium ferrocyanate and hydrochloric acid solutions to the biological material on the slide;
- e) sequentially applying the hematoxylin and aqueous ferric chloride solutions to the biological material on the slide using the automated delivery system; and
- 30 f) mixing the potassium ferrocyanate and hydrochloric acid solutions to stain the biological material.

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(abstract)